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sciousness at a time before reason learned the use of dialectic they would never have been revealed at all. Already we have seen that but for an emotional overflow, external objects would never have been discovered. It is easy to go one step further and turn the objectified feeling into a principle of natural efficiency. Now the "pathetic fallacy" is usually fallacious, but there is one case when it is not, namely, when it happens to be true. Truth must of necessity be an accident in the trial-and-error method. The discovery of other minds comes as the natural result of "varied reaction" when applied to emotional life. Prompted by a vague and indistinct feeling for personal presence, rudimentary consciousness puts out various tentacles one of which, as if by a "miracle of insight," touches the projection of a similar consciousness similarly groping.

This, in outline, is the natural history of reason. It includes the following steps: (1) Antecedents in impulse and imagination; (2) the basal character of pleasure and pain, preference asserted and value revealed; (3) the attachment of ideas to pleasures and the projection of pleasures to objects, interest awakened; (4) the rise of the concept of causality and the external world discerned; (5) explanation required, a theory of knowledge proclaimed, and nature discovered and unified; (6) the discovery of fellow-minds. Inasmuch as results are never mistaken for causes and values never confused with origins, the account is a model of natural description. Were there space in which to add criticism to the foregoing exposition, it would be directed along three main lines. First, a false abstraction, more than merely rhetorical, involved in the separation of impulse, feeling and ideation. Secondly, can one, beginning with the inner life of feeling, the domain where a "stranger intermeddled not," escape subjectivism? Thirdly, by attributing to mind a preference for form and by assigning to reason the function of legislating for nature, is Santayana as far from Kantianism as he thinks he is?

M. T. McCLURE.

TULANE UNIVERSITY.

## THE COÖRDINATE CHARACTER OF FEELING AND COGNITION

ONE of the vexed questions of psychology that troubles the philosopher who would describe the nature of conscious activity is the disputed status of feeling-states. Fourteen years ago C. Stumpf<sup>1</sup> indicated the three possible views in respect to the status of pleasure and displeasure. Feeling may be a quality of sensation (so H. R. Marshall); feeling may be a mental element coördinate

<sup>1</sup> *Zeitschr. für Psych.*, Vol. 44, pp. 1-49, 1906.

with sensation (so E. B. Titchener); feeling may itself be a kind of sensation (Stumpf's *Gefühlsempfindungen* theory). It is not my purpose in this paper to weigh the merits of these theories. I am in sympathy with the second of the three, and so believe that in the unitary conscious state the two aspects, feeling and cognition, are coördinate rather than one subordinate to the other. I do wish to point out, however, perhaps as devil's advocate, that two of the arguments in support of the theory of relative independence of feeling and cognition, although considered impregnable, will not bear the test of close scrutiny.

In his recent book *The Origin of Consciousness*,<sup>2</sup> Dr. Strong makes much of the difference between affective states and sensations in support of his argument for the originality of the psychical. After describing the possible application of the "return wave" theory to feelings, he adduces two criteria by which he judges it proved that feelings and sensations differ fundamentally. He says, "The sensations into which affective and conative states have been resolved are defined as psychic elements due to nerve currents from the periphery; the sensations which are cognitions of the intra-bodily are sensations localized in a particular part, and bringing before us a process occurring there. In especial, the latter class of sensations are attended to—or rather the objects they bring before us are attended to: the sensations constituting pleasure and pain, emotion and will are not attended to. To attend to an emotion is to destroy it—it breaks up at once into the localized sensations which are cognitions of intra-bodily processes" (pp. 85-86). Speaking of affective states, he says, "Objects are localized, they are unlocalized; objects are attended to, they are unattended to and even abolished by attention" (p. 86). Let us examine these alleged criteria.

## I

Feeling-states are said to be abolished when attended to. Unfortunately, the evidence in support of this statement is more of the nature of casual observation than of careful introspective analysis. Nevertheless, the latest evidence, contained in Dr. Wohlgenuth's monograph, *Pleasure-Unpleasure*,<sup>3</sup> goes toward substantiating the common observation that the more one directs his attention to the cognitive aspects of a situation, the less intense are the affective aspects. As Dr. Strong says, "Even in the case of a keen sense of disappointment, where we are very apt to dwell upon the feeling, the keen sensation in the throat of which we quickly become aware

<sup>2</sup> London, 1918.

<sup>3</sup> *Brit. Jour. of Psych.*, Monograph Supplement VI., pp. 1-252, Cambridge Univ. Press, 1919.

is an object that displaces the emotion and makes us in so far no longer disappointed. The young child who simply bawls is the truly disappointed person." Dr. Wohlgemuth, however, found that when a feeling is attended to *as part of a situation* it becomes "clearer." It seems equally to be a fact of common observation that we may increase a sense of disappointment by attending repeatedly to the factors which are associated with the disappointment. The child who is compelled by parental order to stay indoors does not conquer his disappointment by thinking how he might be outside with his companions playing ball. Dr. Wohlgemuth seems to have combined successfully the empirical evidence in his rule, "If a feeling-element is attended to as belonging to a cognitive content, or as part of a situation or complex, it is intensified and becomes clearer; but if an attempt be made to focus the attention upon it to the exclusion of its cognitive concomitant the feeling-element is destroyed."<sup>4</sup>

But the latter half of this rule is not a conclusive argument for the coördinate character of feeling and cognition since there is a parallel case lying wholly within the field of cognition, where direct attention destroys a sensation. The visual field offers a considerable range of given objects to vision. Only one small part of this field, however, may be attended to at any time. The other objects are said to be "marginal." Now how may we attend to objects in the marginal area? The naïve answer would be, Look directly at the objects there. In so doing, however, we no longer view these objects as *marginal*, but as objects at the focal point of attention. It is not even true that in each case the objects will be the same. Marginal objects have an indistinct and blurred character that is quite different from the same objects directly attended to. Furthermore, they sometimes lack some of the qualities that are to be perceived in direct vision. A bit of colored paper held outside the range of the blue-yellow zone appears uncolored when seen marginally—a very different object from the same bit of yellow paper viewed directly. However, it is quite possible by practise to get a clearer view of the paper as a marginal object by choosing a fixation-point to which to attend. In this case the observer attends to the object *as part of a situation*. The parallel with feeling is obvious. Now if feeling might be characterized as of a marginal nature, we should not be able, on the score of a difference of behavior in regard to attention, to affirm its qualitative difference from sensation or to speak of it as an independent element of consciousness.

In this connection the "furtherance-hindrance" theory calls for

<sup>4</sup> *Ibid.*, p. 246. Cf. *Lectures on the Elementary Psychology of Feeling and Attention*, E. B. Titchener, p. 70, New York, 1908.

some consideration. It is well enough established that pleasure accompanies smoothly running activities, whereas displeasure is associated with any impeded progress. What is beneficial to an individual is often marked by unimpeded progress, while an obstacle will stand in the way of an activity. Here we have to do largely with the motor "set" of the organism. Whatever may be the precise neural basis of pleasure-displeasure, it is almost certainly more diffuse than the neural basis of any sense. The facts warrant our admitting the motor elements of reaction as associated in part with feeling. Here some light is thrown upon the relation of attention to feeling. For, if the neural basis of feeling partly consists of nerves leading to the brain from the muscles employed in an activity, it is easy to see that if the attention be directed to these elements to the exclusion of the objects provoking the activity on the sensational side, the motor "set" of the organism will be changed completely.

A second argument in favor of the coördinate character of feeling and cognition is that feelings are non-localizable, whereas the objects of cognition are localized. This argument, however, is not supported by sufficient experimental evidence. In fact, it is directly controverted by Dr. Wohlgemuth who says,<sup>5</sup> "Feeling-elements can often be localized. The ability to do so depends to some extent upon the attitude of the observer toward the feeling-element. The more his attitude allows him to objectify the feeling-element the easier it is to localize the feeling-element, or, possibly, *vice versa*. The question of the localization of the feeling-elements has been as hotly controverted as that of their co-existence, and I hope that now it will be considered as definitely established. All my observers are in agreement about it. . . . The ability to localize the feeling-elements improves greatly with practise. Great individual differences obtain with respect to the ability to localize the feeling-elements, especially those of auditory and visual sensations." In the present state of experimental evidence it seems unwise to base a theory of feeling on the attribute of non-localizability. It may be remarked that it is often extremely difficult to locate precisely some of the cutaneous sensations and more difficult yet to localize the organic sensations.

We must not, however, treat the important alleged criterion of non-localizability in a hasty manner. Observers differ in their results, and the agreement of the four trained observers employed by Dr. Wohlgemuth may not be regarded as absolutely decisive. Much of the difference of opinion, I believe, is due to a lack of agreement among writers as to the meaning of the term "localizability." It

<sup>5</sup> *Op. cit.*, pp. 242-243.

is instructive to turn to Professor Titchener's discussion of the matter.\* He gives two possible definitions: localizability may refer to perceptual space or it may refer to the coextensive character of affective states with the whole conscious state in contrast with the side-by-sidedness of sensations. Dr. Wohlgemuth uses the term with quite a different meaning. His observers locate the affective states in the tongue, mouth, nose, throat, hand, head, etc. Only in the case of visual and auditory sensations do the observers ever refer the affective states to the place of the stimuli in perceptual space. Dr. Wohlgemuth, again, would have no use for the second possible definition of Professor Titchener because his own evidence (and that of Kellogg<sup>7</sup> and others) indicates that mixed feelings are unquestionably a fact.

So far as mixed feelings are concerned, I have long been convinced from my own introspection that they are the rule rather than the exception. The experimental results achieved in this matter convince me that feeling can no longer well be defended as a co-ordinate element of conscious activity on the ground that one and only one quality of feeling is at any one time coextensive with the cognitive element of a conscious state. To the definition of localizability as a projection of the affective elements by conscious activity into perceptual space, I would say that further analysis is demanded. For the definition may mean either of two things: either affective states are supposed to carry with them an affirmation of objects in an existent world parallel to a characteristic affirmation in cognition, or there is said to be in the *content* of sensations and feelings a similarity of spatial reference.

I judge from the words of Professor Titchener and Dr. Wohlgemuth that each emphasizes one of these possible interpretations. Professor Titchener might conclude (although in point of fact he gives up the criterion because of insufficient agreement among observers) that feelings differ from sensations in that the former are localized within the body and the former outside the body. The neat question here implied, but never so far as I know discussed, is whether the affirmation of a feeling as intra-bodily is an existential affirmation of the bodily organs involved, or whether the affirmation is of objects considered merely as given to consciousness.

It is quite possible, however, to determine the validity of the criterion of non-localizability defined in the second way. We may eliminate all affirmations of physical space, including parts of the body; we may eliminate everything that is not integral to the *given* in sensation and feeling. Then we may ask whether sensations and

\* *Op. cit.*, pp. 43-55.

<sup>7</sup> *Psych. Monographs*, Vol. 18, No. 3, 1915.

feelings as given have a local character, an element of *distance from* or "inner space" that may be discovered introspectively. When we do this, however, we find that, although we discover the local character present in all sensations, the attribute has lost the precision that attaches to it in many cases by virtue of an accompanying existential affirmation. We find that there is a whole range of variation, from organic sensations that may just barely be localized, to visual sensations which are quite definitely localized with respect to other sensations in the visual field. The attribute of local character seems definitely to be connected with the place of the sense end-organs *i.e.*, there seem to be places where we see, hear, feel cold, *etc.* But some of the "lower" sensations, although they are discovered to have the spatial reference when truly introspected, are most indefinite in their precise location. They are no more certainly localized than many of the obscurer feelings of pleasure-displeasure. These observations would seem to indicate that localizability is not an intrinsic attribute only of sensations. For feelings have their own curve of localizability, and there is nothing to distinguish the lower limits of the two curves of sensation and feeling as respects this attribute.

The similarity of affective and cognitive states as regards localizability is even more evident when we consider the organization of sense-organs and the relation of organization to marginal consciousness. The cutaneous sense end-organs are organized only to a slight degree; we do find groups of cold and heat spots. But in the "higher" senses the sense-organs contain many end-organs in a circumscribed area. The result is that within the limits of a single sense attention must single out one impression that is focal and leave the others to marginal consciousness. The term "marginal" may be applied to *all* sensations not at the focus of attention. Thus, if I attend to a cold sensation felt in my hand, the cold sensation occurring at the same time in my foot is marginal. Careful study should be made to determine the degree of localizability of two sensations of the same quality as compared with two sensations of different qualities. I believe that the most precise localization is found when two sensations of different quality are derived from end-organs in the same sense-organ. In any such comparison one sensation will always be marginal, as attention can be directed to but one at a time. Marginal visual sensations are most precisely located, next those of sound (by a musical observer).

Now whatever be the neural basis of feeling, it is generally agreed to be less organized and more diffuse than the end-organs of any of the senses. If, therefore, we are right in speaking of feeling as of a marginal nature, we shall expect very little precision in

the matter of localization. We shall expect that individuals will generally disregard the localization of feelings, and that they will find that feelings may be recognized as local only upon careful introspection. On the other hand, the marginal sensations of the visual sense will be so vivid, owing to the high degree of organization of the visual end-organs, that they will be universally recognized.

## II

We may postulate that the question of the relation of feeling to cognition must be decided by introspection of mental states rather than by investigation of their neural bases. Undoubtedly every psychical activity has a neural basis, but there are no two distinct types of neural activity to which cognition and feeling respectively may be referred. Even if there were, our problem would not be solved, as we have to determine whether cognition and feeling are coördinate in *conscious activity*. Consideration of the factor of attention has not revealed any criterion by which this coördinate character may be established. Nor has localizability, applied strictly to conscious states, proved more serviceable (although the possibility of distinction on the basis of a difference of affirmation was suggested as a problem requiring investigation).

It is entirely possible, however, that, when we come to analyze conscious states more fully, we shall find that the qualities of pleasure and displeasure are in some respects not homogeneous with the qualities of sensation. They may have characteristics that warrant their being regarded as a distinct aspect of conscious activity. I believe that there are at least two such characteristics.

1. One can not ever introspect and not discover pleasure, displeasure, or both present in consciousness. Much was made formerly of an "indifference-point." But the theory of pleasure-displeasure as a linear scale has been destroyed as completely as the theory that cold and heat sensations form a linear scale. Feeling would appear to be duo-qualitative, pleasure and displeasure each constituting a linear scale. Furthermore, it is not necessary to the validity of this first criterion that introspection disclose the presence of a feeling-element in association with *every* sensation. To postulate this is to postulate the difficult theory of feeling as an "affective tone" of sensation. It is very likely true that I am quite indifferent to the sounds that are buzzing in my marginal consciousness as I write at the present moment. The essential point is that pleasure or displeasure or both be found *somewhere* in every conscious experience, even if only as an accompaniment of organic sensations. If this requirement be satisfied, it is fair to say that feeling is coördinate with cognition in conscious activity. In respect to the



attribute of being present in every conscious state, feeling will be on the same footing with cognition which, too, is never absent from conscious activity. That feeling is usually (not always) less prominent as a conscious element than cognition is easily understood if feeling is of a marginal character; it would thus resemble marginal visual sensations which are neglected by us habitually a good part of the time.

2. Another firm foundation for the theory of the coördinate character of feeling and cognition is the fact that of the conscious qualities only pleasure and displeasure may become detached from the situation in which they arise and cling in succeeding conscious states to qualities of *any* of the senses. In the field of cognition only one sense has a slightly similar characteristic, and it differs in two ways from feeling: (a) The visual after-image may become attached to a succeeding light-sensation, but here the qualities are within a single sense. (b) The persistence of the visual after-image is marked either by a fusion which abolishes the quality that fuses (as when a red after-image fuses with a blue sensation to form purple), or by an entire absence of fusion, in which case the after-image persist as an independent entity (as when the image floats before the eyes and gets in the way of present vision). Now when pleasure or displeasure continues over from a preceding to a succeeding conscious state, it is not fused with another quality in such a manner as to lose its character of pleasure or displeasure, but, remaining what it was, it colors affectively the new state. Very interesting results as to the behavior of the feeling-elements of moods are reached in Dr. Wohlgenuth's experiments.<sup>8</sup>

The case for feeling as a coördinate aspect of conscious activity, therefore, rests partly on the universal presence of one or both of the affective qualities in all conscious states, partly on a certain independence of cognition manifested by feeling in the production of moods. These facts are more significant than the very questionable arguments adduced from attention and localizability.

MAURICE PICARD.

BARNARD COLLEGE.

## THE BASIC ASSUMPTION OF EXPERIMENTAL SCIENCE

IT is often supposed that experimental science inevitably must assume the existence of an external world which, to a certain but very important extent, is not subject to the control of the more or less passive observer. Moreover, it is supposed regardless of what may be the case for such pure or abstract non-experimental sciences

<sup>8</sup> *Op. cit.*, pp. 243-244.